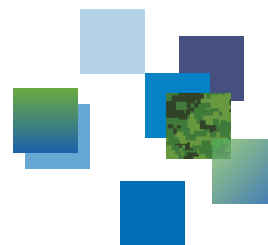




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A road map to Canadian chemical recovery handbook for inhabited areas: Scoping study

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A Road Map to Canadian Chemical Recovery Handbook for Inhabited Areas: Scoping Study

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1. Background

Incident, deliberate or accidental, involving chemicals may cause mass disruption, casualties and can have long-lasting effects on the communities involved. In view of different types of potential incidents, a variety of buildings, environments and infrastructures could be affected. To deal with such situation contingency plans should be in place for safe and rapid recovery of the affected areas.

“Recovery” refers to a broad spectrum of actions taken to restore an affected area or infrastructure as early as possible to its pre-emergency condition. It includes both short and long-term activities to reduce exposure rates and concentrations of the contaminants in the environment to acceptable levels for unconditional occupancy.

Current study aims to develop a framework for Canada for the selection of an effective recovery strategy after a chemical incident. Australia, USA European countries have their own handbooks but no such document exists in Canada. The document developed under this study will provide a compendium of management options soundly based on science and practicable practices through the involvement of various stakeholders.

2. Project Objective

To create a base upon which to prepare a Canadian chemical recovery handbook that may be used as a guidance document by local authorities, stakeholders and emergency response teams for contingency planning, recovery and decontamination of inhabited areas after a chemical event.

3. Tasks Completed

The following tasks were completed:

- Studied information and documents available in Canada related to incident response at federal, provincial and municipal levels.

- Gathered information on Canadian Acts and Legislations related to critical incident response and their possible application during recovery phase.
- Conducted literature search and analysis of available data from similar guidance documents of other countries including Australia, USA and European countries.
- Identified appropriate sources of information who were involved in developing recovery guidance documents.
- Evaluated decontamination procedures and protocols that are currently employed for infrastructure restoration after a CBRN incident.
- Gathered information on potential Canadian decontamination contractors through Transport Canada's Emergency Response Assistance Plan (ERAP) and Canadian Emergency Responders Contractors Alliance (CERA).

4. Results

Information was gathered, reviewed, consultations performed and gaps identified related to the development of a chemical recovery handbook for Canada:

- **Literature search and data analysis**
The literature search revealed that several countries have already developed their own recovery plans/programs. These plans are data driven and process oriented for implementation at federal, provincial and municipal levels involving end-users and first responders. They are well documented, routinely audited, and revised by experienced scientific and technical group of professionals.
- **Sources of information:**
As project task contact information was gathered on potential sources/departments/agencies of other countries. These sources may provide useful information and guidance that may help in the preparation of the Canadian recovery handbook. These identified sources include:
UK: a) Health Protection Agency, Centre for Radiation, Chemical And Environmental Hazards, Oxfordshire

- b) Government Decontamination Services (GDS)
Beaconsfield, Stafford

- USA:**
- a) Federal Emergency Management Agency (FEMA)
Technological Hazards Division
National Preparedness Directorate
Washington, DC
 - b) EPA-Chemical Emergency Preparedness and Prevention
Office (CEPPO)
Washington, DC
 - c) Office of Critical Infrastructure Protection (CIP)
National Homeland Security
Washington, DC.

- EU:**
- a) Organization for Economic Co-operation and
Development (OECD). Most of the European countries are
members of OECD. The Environment Directorate
located in Paris, France.

- Australia:**
- a) Emergency Management Australia (EMA)
Office of Attorney General, Canberra.
 - b) Australian Emergency Management Institute
Mount Macedon, Victoria

- Scandinavia:**
- a) Nordic Nuclear and Chemical Safety Research
NKS Secretariat, Roskilde, Denmark

- **Canadian Guidance Documents:**

The following documents were identified that cover the response and recovery efforts after a CBRNE incident:

- a) ***“Emergency Management Act”***

(Last amended 2007)

Under this act Public Safety is responsible to monitor, coordinate Government of Canada’s response to an emergency. The responsibilities include conducting exercises, provide training and facilitate information sharing among departments.

b) “Federal Emergency Response Plan” (2011)

This plan is meant to harmonize federal emergency response efforts with those of the provinces/territorial governments and non-governmental organizations. It also provides details on the role of primary department and also identifies support departments that may aid the primary department in fulfilling their mandate in an emergency.

c) “National Emergency Response System (NERS)” (2011)

This document differs from others as it identifies the potential requirements for a Recovery Working Group and a CBRNE Working Group at the operational level.

d) “Emergency Management Planning Guide” (2010-2011)

This document provides plans and advice to departments within Government of Canada on how to develop their own Strategic Emergency Management Plans (SEMPs).

e) “CBRNE Resilience Strategy for Canada” (2011)

This document provides policy framework that will guide the creation of sustainable capabilities and common standards in CBRNE policies, programs, equipment and training. The resilience strategy is based on the four components of emergency management, prevention, preparedness, response and recovery.

f) “CBRNE Resilience Action Plan for Canada”

It details specific actions to guide the development and review of policy and allocation of resources by all levels of government and contributors, as well as inform those engaged in scientific research, towards fostering and promoting CBRNE resilience.

g) “Canadian Environmental Protection Act (1999)”

This Act details the preventative and remedial measures Government of Canada should take to protect, enhance, and restore the environment. Under this act 215 regulated substances are monitored and also details the responsibilities of individuals and companies store and use listed substances.

h) “Transportation of Dangerous Goods Act” (2011)

This Act promotes measure to prevent accidents in the transportation of dangerous goods.

i) “Emergency Response Guidebook” (2012)

The 2012 Emergency Response Guidebook (ERG2012) was developed jointly by Transport Canada (TC), the U.S. Department of Transportation (DOT), the Secretariat of Transport and Communications of Mexico (SCT) and with the collaboration of CIQUIME (Centro de Información Química para Emergencias) of Argentina. This is primarily a guide to aid first responders in quickly identifying the specific or generic hazards of the material(s) involved in the incident, and protecting themselves and the general public during the initial response phase of the incident.

j) “Restoration after a Chemical Attack: Laboratory Research Study” (2006)

This study was conducted by Environment Canada and funded by CRTI. Information was gathered and compiled on most promising procedures for the restoration of areas after a chemical attack including buildings, the interior contents of buildings and areas around as well as the air inside the building.

k) “Field Demonstration of Chemical Decontamination” (2008)

Funded by CRTI and led by Environment Canada, this project conducted field trials and gathered large-scale data on building decontamination operations.

l) “Release of Toxic Organic Chemicals from Surface Materials: Laboratory Research Study” (2011)

Similar to above this study was also undertaken by Environment Canada and investigated the relationships between the concentrations of toxic chemicals on the surface and surrounding air.

- **Guidance Documents of Other Countries:**

a) “UK Recovery Handbook for Chemical Incidents” (2012).

Document published by UK Health Protection Agency. This is a user friendly guidance document to help decision making authorities an effective recovery strategy in the aftermath of a chemical incident.

b) “Strategic National Guidance: The decontamination of buildings, infrastructure and open environment exposed to chemical, biological, radiological or nuclear materials” (2011).

Document published by UK Food and Environment Research Agency and gives basic information to public and private sector on the decontamination and remediation after CBRN release.

c) “US Chemical Stockpile Emergency Preparedness Program (CSEPP). A Recovery Plan Workbook”.

(Published 2003, updated 2008).

This document was developed by Argonne National Lab for CSEPP Re-entry and Recovery Working Group. Federal Emergency Management Agency (FEMA).

d) “Recovery from a Chemical Weapons Accident or Incident: A concept Paper on Planning”. (Published 1994, updated 2008).

This document was developed by Argonne National Lab, for Office of the Assistant Secretary, Installations, Logistics, and Environment.

e) “How Clean is Safe? Improving the Effectiveness of Decontamination of Structures and People Following Chemical and Biological Incidents” (2002).

This report was prepared by Oak Ridge National Laboratory for US Department of Energy under Chemical and Biological National Security Program.

f) “Guide for the Selection of Chemical and Biological Decontamination Equipment for Emergency First Responders”(2001)

This guide is prepared by US National Law Enforcement and Corrections Technology Centre for US Department of Justice. It focuses specifically on chemical and biological decontamination equipment to assist emergency first responder community in the

evaluation, selection and use of most appropriate decontamination equipment during an emergency situation.

g) “Building Decontamination Alternatives” (2005)

This report is prepared Science Applications International Corporation (SAIC) for Office of Research and Development, US National Homeland Security Research Centre. This document provides detailed information on technologies that could potentially be utilized in decontamination of an infrastructure after chemical or biological incident.

h) “OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response” (2003).

This is the standard strategic guidance prepared on chemical incidents and used by all OECD including EU countries.

i) “Australian Emergency Management Handbook Series” (2011) Handbook 2: Community Recovery. Manual 10.

Published by Australian Emergency Management Institute (under Commonwealth Attorney-General’s Office).

j) “Flexible Framework for Addressing Chemical Accident Prevention and Preparedness: A Guidance Document” (2010).

Prepared by United Nations Environment Programme (UNEP).

Gap Analysis and Recommendations:

Element	Gap	Recommendation(s)
Canadian Acts and Legislations	No clear legislations on liabilities and compensation.	Amend Acts and Legislations (Emergency Management Act, Environmental Protection Act) to determine stake holder’s responsibilities and liabilities. Other issues such as compensation for life and property loss during recovery operations should also be addressed.

Use of Technology	No emergency response plan available in Canada that includes technical requirements during recovery operations.	Develop a strategic guidance that provide technical information on cleanup technologies, handling of waste generated and other problems encountered during decontamination.
Role of Science Community	No mechanism on how science community will contribute in a post CBRNE scenario.	Similar to UK, establish a Recovery Coordination Group (RCG). This will be a group of technical experts from various institutions that will provide expert advice on the selection of decontamination methods, techniques and equipments during recovery operations.
Private Decontamination Contractors	<p>Lack of information/network on potential Canadian private decontamination contractors.</p> <p>No quick and efficient mechanism on how to engage them during recovery operations.</p>	<p>Use Transport Canada Emergency Response Action Plan (ERAP) and Canadian Emergency Responders Contractors Alliance (CERCA) programs as model to establish a CBRNE decontamination contractor network.</p> <p>Although provisions are made for emergency contracting under the Government Contracts Regulation, a standing order or supply arrangement contract could be in place within hours instead of days under the regulation.</p>
Training and Exercise	No program on training/exercise exists for stake holders, emergency	As outlined under Canadian “Emergency Management Act and Emergency Management Planning Guide, 2010-2011”

	response teams and contractors on CBRNE recovery operations.	develop training and exercise programs involving Public Safety, Health Canada, Transport Canada and other federal and provincial agencies.
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This handbook will address the above gaps and will provide users practical advice on the management processes and methods of recovery after chemical incidents, supported by relevant technical and logistical information.

5. Significance of Results

The results of this study will:

- Impact Canada's CBRNE recovery activities by creating a road map to develop a comprehensive document for fast and effective recovery after a chemical incident.
- Be useful not only during emergency situation but can also be used as a preparatory tool, under non-crisis conditions, to engage stakeholders and to develop local and regional plans.
- Fill several gaps in Canadian Acts and Legislations to make them more effective during an emergency situation.
- Contribute to CSSP goals to increase the breadth and depth of CBRNE capability in Canada.
- Help build relationship with international emergency management departments and organizations.
- Be the first and only document in Canada that will provide information, data and a framework to federal authorities, stakeholders, and emergency services to select an effective recovery strategy after a CBRNE incident.
- Address gaps, post decontamination implications and their solutions such as waste generation and its disposal, cost factor and other management issues.
- Provide information on Canadian Decontamination Contractors regarding their capabilities and experience as well as a quick and efficient mechanism to engage them for CBRNE response.

- Provide a framework for regular table top training and exercise for stakeholders, emergency responders and contractors. This will enhance their response capabilities to CBRNE incident.

6. Recommendations for Future Work

The information generated in this scoping study provides a basis for a follow-on project to develop a Canadian chemical recovery handbook for inhabited areas. The following tasks are proposed:

*a) **Gather Missing Information*** - Based on the details compiled in this study, additional information will be gathered to fill identified gaps. Representatives from countries having such document will be contacted through a consultation questionnaire and conference calls.

*b) **Evaluate Canadian Legislation and Guidelines*** - Current Canadian Acts and Legislations will be further evaluated on how they impact the post incident recovery strategy and decisions. The departments who have mandated on implementation such legislations will be approached for necessary amendments to address the identified gaps.

*c) **Define Roles and Responsibilities of Organisations*** - In collaboration with federal, provincial, municipal authorities and other organisations a plan will be developed that will clearly identify role and responsibilities of each department in decision making and implementation of recovery strategy.

*d) **Identify Restoration and Decontamination Technologies*** – Available remediation/decontamination technologies will be evaluated. This will provide information to end users on options and key considerations prior to commencing cleanup in terms of cost, technology selection, waste management etc.

*e) **Define the Role of Canadian Decontamination/Cleanup Contractors*** - Information will also be gathered and documented on potential Canadian clean-up contractors who will safely implement the recovery and decontamination phase under the direction of local authority. Information will also be gathered to develop a quick and efficient method to engage them in an emergency situation.

f) Organize Workshops on Chemical Emergency Response and Recovery - A series of workshops will be organized with the participation of Canadian stake holders, first responders, federal, provincial, municipal authorities and specialized decontamination contractors. These workshops will address issues, challenges and their solutions that may be encountered during recovery operations.

g) Develop Training and Exercises– Training and table top exercises will be held on a regular basis for emergency responders, contractors and stakeholders. This program will provide participants with requirements and contemporary methods of site decontamination and their possible applications under various conditions and enhance their emergency response and recovery capabilities.

h) Develop a Guidance Book - All the above information will be compiled, documented and made available in the form of a “Canadian Chemical Recovery Handbook for Inhabited Areas”.

7. Acknowledgements

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